

## Gas Mileage Estimates and Labeling

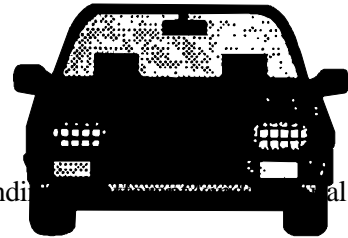
### How are the gas mileage estimates on the car labels obtained?

The gas mileage estimates are based on results of tests required on new motor vehicles (cars and light trucks). Designated pre-production prototypes of new models are driven by a trained driver on a dynamometer, an instrument similar to a treadmill. The same tests are performed on each vehicle tested, following approved procedures, as described in the Federal codes or regulations. These procedures ensure that each vehicle is tested under identical conditions, therefore, the results can be used with confidence to compare similar cars.

Two different tests and gas mileage estimates are done for each vehicle tested; a city estimate, designed to represent typical everyday driving in a city, and a highway estimate, to represent driving in a rural setting. The tests measure the waste substances emitted from consuming the fuel, *not the actual fuel consumed*. From the measurement of emissions, EPA can estimate the miles per gallon achieved by the vehicle on average.

The test used to determine the *city* estimate simulates a 7.5 mile, stop-and-go trip with an average speed of 20 mph. The trip takes 23 minutes and has 18 stops. About 18 percent of the time is spent idling, as in waiting at traffic lights or in rush hour traffic.

The test to determine the *highway* estimate represents a mixture of 'non-city' driving. Segments corresponding to city streets, arterial roads and interstate highways are included. The test simulates a 10 mile trip and averages 48 mph. The test is run when the engine is warmed up and with very little idling time and no stops until the end of the test.



To make the numbers on the labels more useful for consumers, EPA adjusts the laboratory test results to account for the difference between the controlled laboratory conditions and actual driving on the road. The city estimate is lowered by 10% and the highway estimate by 22% from the laboratory test results. Experience has proven that these adjustments make the mileage estimates on the labels correspond more closely to the actual gas mileage gotten by an average driver.

### Why does my actual mileage vary from that given on the label?

No test can simulate all possible combinations of conditions, climate, driver behavior, and car cue habits. EPA adjusted the laboratory test results based on an average of the factors which can change mileage (described in following question). Your actual mileage depends on how, when, and where you drive and how closely this matches the average conditions used by EPA in determining mileage. EPA has found that the mpg obtained by most drivers will be within a few mpg of the estimates on the labels. Each label also lists a range of mpg that can be expected given certain variables.

If you drive under conditions different from the average used in determining the estimates, you might not stay within the range.

## What are some of the things that can change mileage?

- **Temperature.** The laboratory tests are all done to simulate a 75°F day. Cooler temperatures will significantly decrease gas mileage, especially during short trips, because extra fuel is required to heat the engine.  
Tire rolling resistance also increases significantly at cooler temperatures.

- **Road conditions and terrain.** Gas mileage is decreased by rough pavement, pot-holes, gravel-surfaced roads, wet roads, and snow-covered roads. Going uphill decreases gas mileage substantially, up to 30% for the steepest grades usually encountered on main highways. The energy saved in going downhill is less than the extra energy used to go uphill, so overall gas mileage is decreased in hilly terrain.



- **Vehicle load.** The laboratory test represents a vehicle containing an average-weight driver, a passenger, and certain options. Extra passengers, additional options, or other weight carried or pulled will decrease fuel economy.

**Optional equipment.** While the use of some optional equipment, such as air conditioners or a loaded roof rack, is averaged into the laboratory tests, they cannot be totally accounted for. These items not only add weight to the vehicle, but place increased loading on the engine. The four-wheel drive option adds weight, rotating inertia, and frictional drag. Any of these options decrease gas mileage. On the other hand, the use of engine block heaters and radial tires tend to improve gas mileage.

**Vehicle speed and wind conditions.** The laboratory tests are done at moderate speeds. Although the estimates from these tests are adjusted, in-use vehicles which are driven at speeds above the posted speed limits may not achieve the EPA estimates. For example, driving at 65 mph instead of 55 mph decreases gas mileage by about 15%.

Driving into a headwind decreases gas mileage, while tail winds increase mileage. Crosswinds can also decrease gas mileage.

- **Vehicle condition.** Proper maintenance helps to ensure a car achieves its best mileage. A poorly maintained car may consume up to 15% more fuel. Some common causes of excess fuel consumption are low tire pressure, misfiring, incorrect wheel alignment, low transmission fluid level, and excessive brake drag.
- **Length of trip.** Taking short trips, especially starting with a cold engine, causes very high fuel consumption. Energy is required on each trip to get the engine up to operating temperature.
- **Driving style.** Different drivers using the same vehicle over the same road and in the same weather conditions experience up to a 20% variation in fuel consumption. Aggressive driving habits such as unnecessarily quick accelerations, fast stops, or driving at high speeds result in higher fuel consumption. Long engine idling also increases fuel consumption.

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